

**A Watershed Conditions Report  
For the State of Kansas  
HUC 10290101  
(Upper Marais Des Cygnes) Watershed**



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# **Watershed Conditions Report For HUC 8 10290101(Upper Marais Des Cygnes)**

Prepared by  
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10/23/00

## **EXECUTIVE SUMMARY**

This Watershed Conditions Report is designed to serve as a water quality “atlas”, and is intended to provide stakeholders in water quality with a tool to assess the quality of water resources within their watershed. Surface water quality for HUC 8 10290101 streams and rivers is generally fair with a little more than half of the surface water bodies not meeting their designated uses. This watershed is primarily drained by the Marais Des Cygnes River. The primary pollutant concern within HUC 8 10290101 streams and rivers is dissolved oxygen (DO). Low DO levels typically coincide with an abundance of algae, which may be caused by excess nutrients. An abundance of algae causes the population of decomposers to increase, which in turn uses up the oxygen in the stream or river. Additional pollutant concerns within this watershed are ammonia, fecal coliform bacteria (FCB), and silt. Ammonia is a chemical which is toxic to fish and aquatic organisms. Fecal coliform bacteria is found in the digestive systems of warm blooded animals. In the environmental coliform bacteria is an indicator of potential disease producing organisms. Silt loading is a result of erosion as the bare soil enters the water body and settles to the bottom. Silt decreases water clarity and eventually decreases water storage capacity. Silt also carries phosphorous into the water body, which can accelerate eutrophication.

Huc 10290101 includes two large reservoirs (Melvern, Pomona). The primary pollutant concern for these lakes is eutrophication. Eutrophication is a natural process which creates conditions favorable for algae blooms and excess plant growth. This process is often accelerated by excess nutrient loading from the watershed. Additional pollutant concerns for lakes within this watershed include excess biomass and silt.

Groundwater resources in HUC 8 10290101 include Alluvial aquifers of the Marais des Cynes River and it's tributaries and the Douglas aquifer. Nitrate is the primary pollutant concern for this watershed's groundwater.

## **PURPOSE**

The Watershed Conditions Report is designed to serve as a water quality “atlas” for a given watershed, and is intended to provide Watershed Stakeholders Committees (WSC) with a tool to assess the quality of water resources within their watershed.

## **BACKGROUND**

The Clean Water Act mandated that States assess the quality of their waters and implement Total Maximum Daily Loads (TMDLs) for water bodies that do not meet their designated uses. The following is a summary of steps taken by the State of Kansas to comply with these requirements of the Clean Water Act.

The Kansas Department of Health and Environment (KDHE) prepared the Kansas Unified Watershed Assessment in 1998. This assessment classifies the State’s watersheds into four categories. A Category I classification means the watershed is in need of restoration due to having water quality impairments or degradation of other natural resources related to an aquatic habitat, ecosystem health and other factors related to aquatic life resources. Category II are watersheds in need of protection. Category III are watersheds with pristine or sensitive aquatic system conditions on lands administered by federal, state, or tribal governments. Category IV watersheds are those for which there is insufficient data to make accurate classification. KDHE then assigned a restoration priority score to each Category I watershed.

As mandated by section 303(d) of the Clean Water Act, Lakes and streams within the Category I watersheds, which do not meet water quality standards, are published biannually in the 303(d) list. Subsequently, lakes and streams which appear on the 303 (d) list are scheduled to have a Total Maximum Daily Loads (TMDL) prepared. KDHE is currently preparing TMDLs for impaired stream segments located within the highest restoration priority watersheds.

To restore water quality within the Category I watersheds, KDHE recommends the implementation of a Watershed Restoration and Protection Strategy (WRAPS). The ultimate goal of the WRAPS process is to create and implement a plan to restore the health of water bodies that do not meet their water quality standards. Additionally, the WRAPS process will insure that water bodies that currently meet their water quality standards are protected.

KDHE recommends that the WRAPS process be implemented on a local level by a Watershed Stakeholders Committee (WSC). The WSC would have the responsibility of working with local and state agencies to develop a WRAPS plan. This plan should identify the following: public outreach methods; required monitoring activities based on water quality goals and outcomes; specific water quality problems; watershed coordinator/evaluator; actions to be taken to achieve water quality goals and outcomes; schedule for implementation of needed restoration measures; and funding needs.

## Streams and Rivers

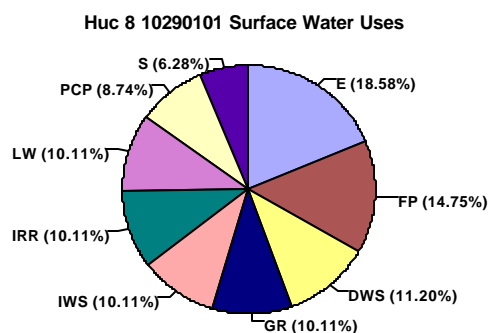
### **HUC 8 10290101**

The Huc 8 10290101 watershed is ranked fifth in priority for watershed restoration throughout the state. According to the Unified Watershed Assessment, approximately 50.6% percent of the total miles of water in this watershed do not meet their designated uses. The Marais Des Cygnes River, Pottawatomie Creek, Mud Creek, and Tequa Creek are among the larger rivers and creeks. See Attachment 1 for a map of streams and rivers in HUC 8 10290101.

### Designated Uses

According to the Kansas Surface Water Register, the most common designated uses for stream and river segments monitored are: expected aquatic life uses, food procurement and domestic water supply. Additionally, there are 30 public water well supplies within the watershed, many of which draw water from the Marais Des Cygnes River and its alluvium.

**Figure 1**



pS=Special Aquatic Life Use Water  
pE=Expected Aquatic Life Use Water  
pFP=Food Procurement  
pDWS=Designated for domestic water supply  
pGR=Designated for ground water recharge.  
pLW=Designated for livestock watering use.  
pIWS=Designated for industrial water supply  
pIRR=Designated for irrigation use.  
pPCR=Designated for contact recreational use.

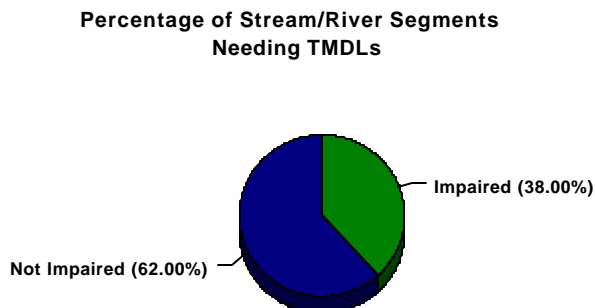
### TMDL/Contaminate Concerns

Streams and rivers throughout Kansas have been sub-divided into segments. By dividing the streams and rivers into segments they can be better analyzed and understood. A reach of river or stream may have segments which vary greatly in water quality, based on surrounding land uses. The figures below display the impairments of the streams and rivers based on the number of segments sampled.

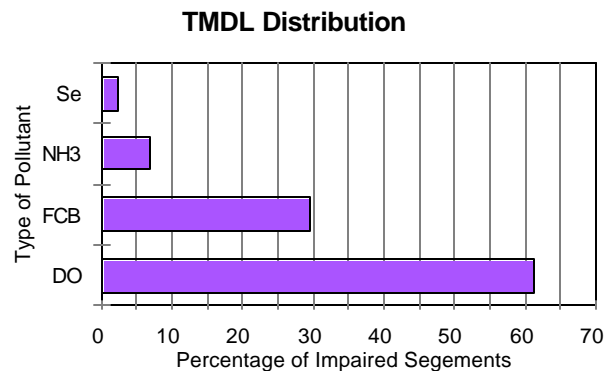
Surface waters not meeting their designated uses will require total maximum daily loads (TMDLs). As shown in Figure 2 below, 38% of the stream/river segments sampled are impaired and require TMDLs.

Figure 3 shows that approximately 61% of these impaired stream/river segments are impaired by dissolved oxygen (DO), 30% by FCB, 3% by ammonia (NH<sub>3</sub>), and 1% by sediment. The primary pollutant concern within this watershed's streams and rivers is dissolved oxygen (DO). Low DO levels typically coincide with an abundance of algae, which causes the population of decomposers to increase which in turn uses up the oxygen in the stream or river. FCB is a bacteria present in human and animal waste. It serves as an indicator of potential disease causing organisms. Ammonia is a chemical which is toxic to fish and aquatic organisms. Sediment loading is a result of erosion as the bare soil enters the water body and settles to the bottom. Silt increases the cloudiness of the water body, creates a displeasing color, and fills the stream or river bottom.

**Figure 2**



**Figure 3**



### **Potential Pollution Sources**

Potential sources of FCB and the nutrients causing DO include feedlots, wastewater treatment facilities, septic systems, pesticides, fertilizers, and wildlife. Potential sources of ammonia include livestock, septic systems, wildlife, and wastewater treatment facilities. Potential sources of sediment include construction sites, row crop agriculture, and stream bank erosion.

Analyzing the land uses within this watershed helps to understand which land uses might have greater influences on the source of the impairments. Below is a list of the land uses in this watershed. Grassland is considered grazing land for cattle and livestock waste is potentially one of the main contributors to excess nutrients in this watershed.

p Urban Area.... .8%	p Wooded area...6.7%
p Row Crop....28.6%	p Water area.... 1.6%
p Grassland....62.0%	p Other.... .2%

**Feedlots:** In the State of Kansas, confined animal feeding operations (CAFOs) with greater than 300 animal units must register with KDHE. There are approximately 267 registered CAFOs located within HUC8 10290101 (this number, which is based on best available information, may be dated and subject to change). Waste disposal practices and waste water effluent quality are closely monitored by KDHE for these registered CAFOs. Because of this monitoring, registered CAFOs are not considered a significant threat to water resources within the watershed. A portion of the State's livestock population exists on small unregistered farms. These small unregistered livestock operations may contribute a significant source of fecal coliform bacteria and nutrients, depending on the presence and condition of waste management systems and proximity to water resources.

**Wastewater Treatment Facilities:** There are approximately 37 wastewater treatment facilities within the watershed (this number may be dated and subject to change). These facilities are currently regulated by KDHE under National Pollutant Discharge Elimination System (NPDES) permits. These permits specify the maximum amount of pollutants allowed to be discharged to the "waters of the State". Due to the chlorination processes involved in municipal waste treatment, these facilities are not considered to be a significant source of fecal coliform bacteria; however they may be a significant source of nutrients.

**Septic Systems:** There are currently thousands of septic systems within the watershed and this number is increasing. When properly designed, installed, and maintained, septic systems can act as an effective means of wastewater treatment. However, poorly maintained or “failing” septic systems can leach pollutants into nearby surface waters and groundwater. The exact number of failing septic systems within the watershed is unknown; however the number may be increasing due to the current trends in suburban development. Local Environmental Protection Programs and County health departments may provide excellent sources of information regarding the proper design, installation, and maintenance for septic systems.

**Wildlife:** Wildlife located throughout the watershed are not usually considered a significant source of nonpoint source pollutants. However, during seasonal migrations, concentrations of waterfowl can add significant amounts of fecal coliform bacteria and nutrients into surface water resources.

**Row Crop Agriculture:** As shown above, approximately 26% of the watershed’s land is used for row crop agriculture. Row crop agriculture can be a significant source of nonpoint source pollution. Common pollutants from row crop agriculture include sediment, nutrients, pesticides, and fecal coliform bacteria. Many producers within the watershed regularly implement and maintain BMPs to limit the amount of nonpoint source pollutants leaving their farm. Some common BMPs include: the use of contour plowing; use of cover crops; maintaining buffer strips along field edges; and proper timing of fertilizer application.

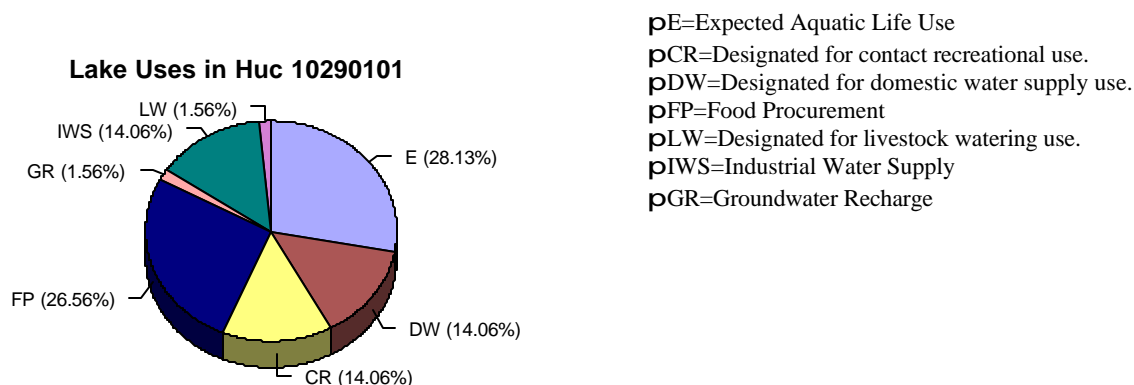
### Lakes & Wetlands

Huc 8 10290101 is the home to Melvern Lake, Pomona Lake, Cedar Creek Lake, Lyon County State Fishing Lake, and several other city and county lakes. Melvern lake is popular for fishing, camping, water skiing, and biking. This huc also has one wetland called the Melvern Wetland Area. See Attachment 2 for a map of the lakes in HUC 8 10290101.

### Designated Uses

According to the Surface Water Register, majority of the lakes in this watershed are designated for expected aquatic life use, food procurement, domestic water supply, contact recreation, and recreational purposes.

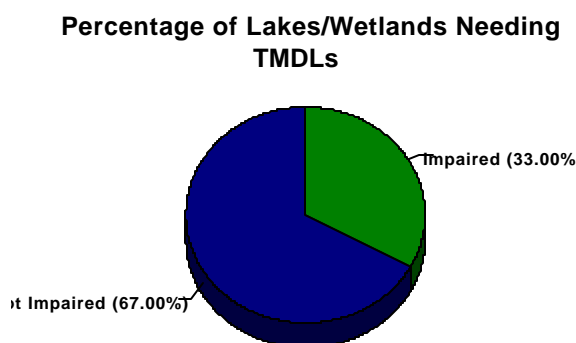
**Figure 4**



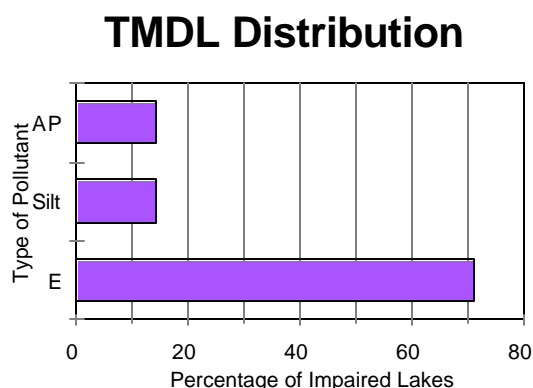
## **TMDL/Contaminate Concerns**

Surface waters not meeting their designated uses will require total maximum daily loads (TMDLs). Figure 5 shows that 33% of the lakes in this watershed need TMDLs. The primary pollutants for this watershed's lakes and wetlands are eutrophication (E), excessive biomass (AP), and silt. As shown in Figure 6, 71% of the impaired lakes/wetland segments are impaired due to eutrophication. The remaining impairments, excess biomass (AP) and silt are present in over 14% of the impaired lakes. Eutrophication is caused by excess nutrients from a variety of nitrogen and phosphorous sources including row crop agriculture, feedlots, septic systems, and urban/suburban runoff. Excessive biomass is an abundance of vascular plants that tend to be a nuisance and interfere with designated water uses. Silt loading is a result of erosion as the bare soil enters the lake and settles to the bottom. Silt increases the cloudiness of the lake, creates a displeasing color, and fills the lake bottom.

**Figure 5**



**Figure 6**



## **Potential Pollution Sources**

Based on the watershed's land use percentages, the primary pollutant sources for nutrients causing eutrophication may be livestock waste from grasslands used for grazing. Additionally, row crop agriculture, feedlots, septic systems, and urban/suburban runoff may contribute significant amounts of nutrients into the watershed.

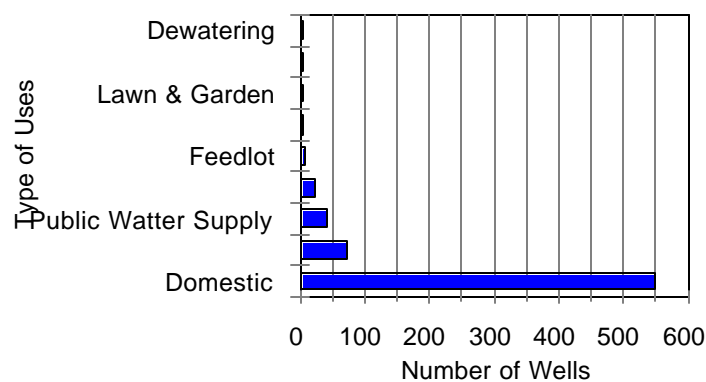
## Groundwater

Major groundwater aquifers underlying this watershed are portions of Alluvial aquifer's of the Marais Des Cygnes River and it's tributaries and the Douglas Aquifer. See attachment 4 for a map of groundwater aquifers within this watershed.

### Designated Uses

There are approximately 694 groundwater wells located within the watershed. Water from these wells is used for domestic use, monitoring wells, public water supply, feedlots, lawn & garden, and several other uses as shown below.

## Groundwater Uses



### Aquifer Characteristics

**Alluvial Aquifer:** Alluvial aquifers of the Marais Des Cygnes River provide the primary water source for many public water supplies located within the watershed. Water quality in alluvial aquifers is generally good; however tends to be very hard and nitrates, minerals, pesticides, and bacteria can be pollutant concerns.

**Douglas Aquifer:** Portions of the Douglas aquifer exist in the southwestern portion of the watershed. Water from this aquifer is also used for rural domestic water supply, food procurement, recreational activities, and expected aquatic use. Water from this aquifer is also very hard with nitrates being one of the primary pollutant concerns.



### **Potential Pollution Types and Sources**

Common groundwater pollutants include: nitrates, chloride, sulfates, ammonia, iron, manganese and volatile organic compounds (voc's). Nitrate impaired groundwater is perhaps the most prevalent groundwater contamination problem in the state.

**Nitrate:** Nitrate is a naturally occurring compound and is an essential component of all living matter. However, high concentrations of nitrate in drinking water can cause adverse health effects including “blue baby” syndrome. Sources of nitrate include municipal waste water treatment plant discharges, runoff from livestock operations, leaching of fertilizer from urban and agricultural areas, and failing septic systems.

**Chloride:** Chloride is a naturally occurring mineral found in Kansas lakes, streams, and groundwater. In high concentrations, chloride can cause deterioration of domestic plumbing, water heaters, and municipal water works. The primary source of chloride impacted groundwater is intrusion of salt water from deeper formations, due to improperly constructed water wells which allow confined aquifers to come into contact with each other.

**Ammonia:** Ammonia is a chemical which is toxic to fish and aquatic organisms. Sources of ammonia are livestock, septic tanks, fertilizer, municipal and industrial waste.

**VOCs:** Volatile Organic Compounds, also called purgeable organics, are components of fuels and solvents. They are ingredients in many household and industrial products. Sources of VOCs are leaking fuel storage tanks, trash dumps, and some agricultural pesticides.

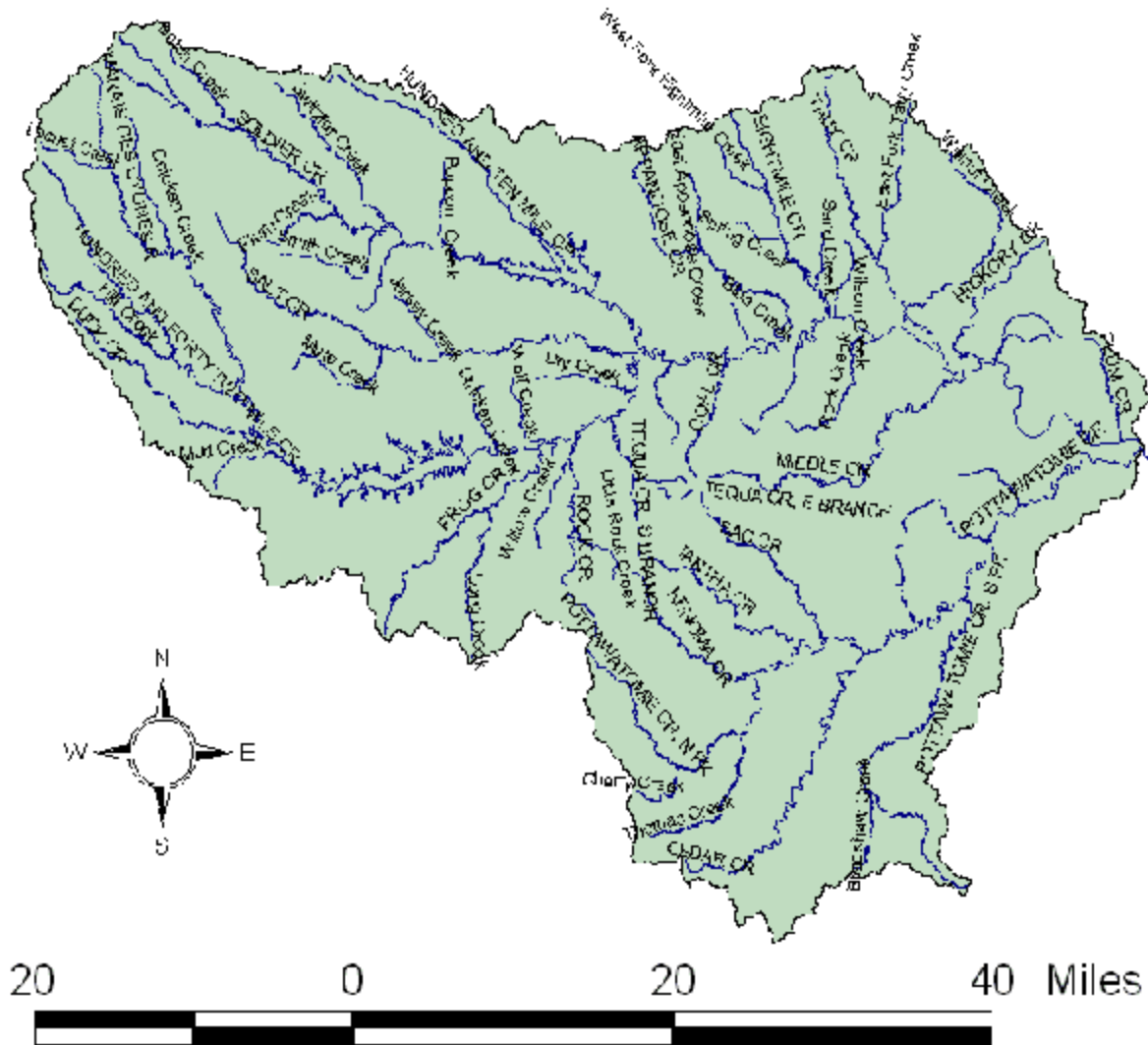
**Iron:** Iron is a naturally occurring element found in the soil throughout Kansas. It is an annoyance as it has an objectionable taste, causes a red stain to porcelain fixtures and laundry, and causes plumbing irritations.

**Manganese:** Manganese is a naturally occurring element and causes an unpleasant taste in drinking water, stains porcelain and laundry, and collects deposits in plumbing. It is naturally occurring throughout the soils in the state.

## **Attachment 1**

### **Maps**

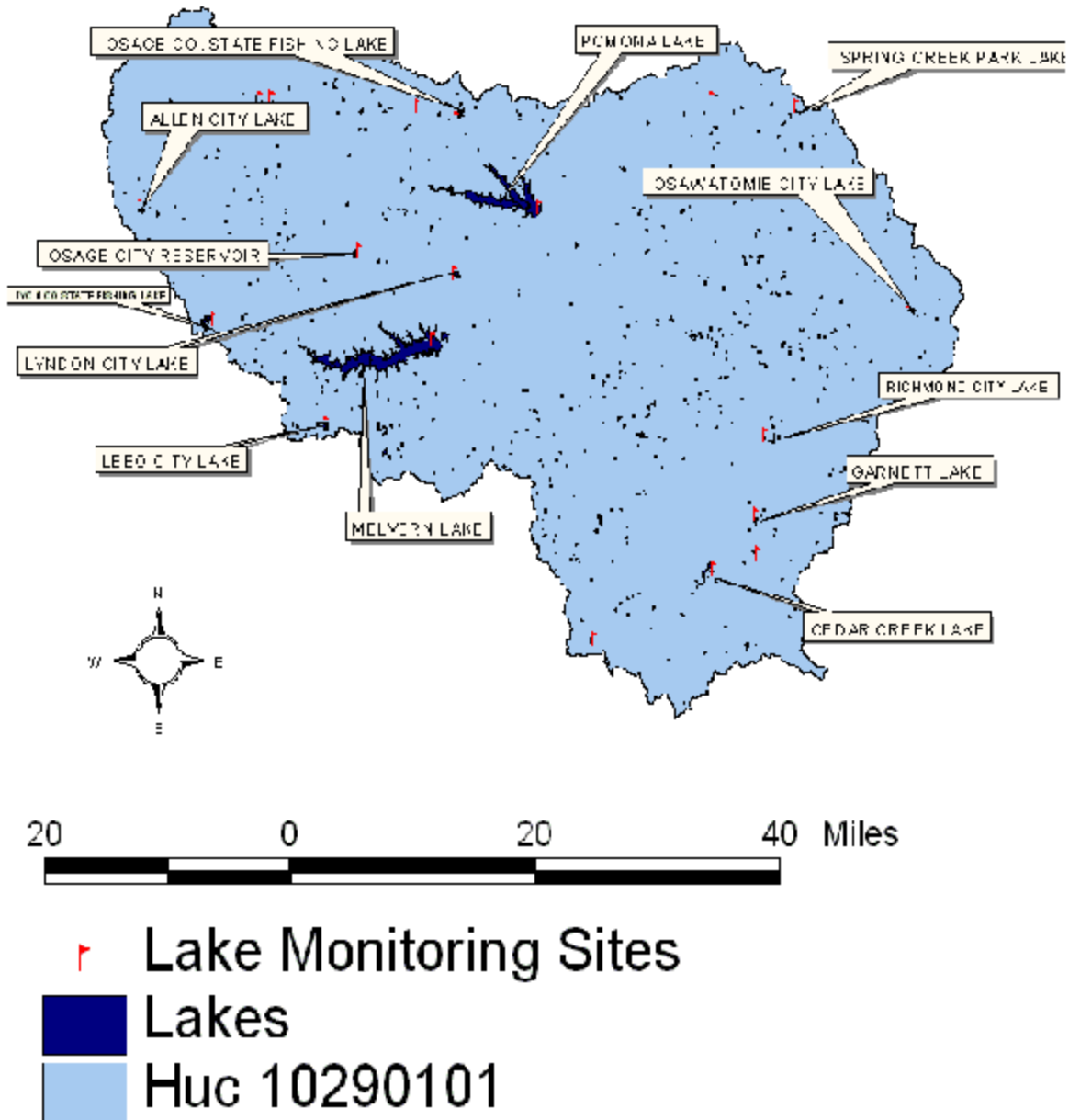
Huc -10290101- Upper Marais De Cygnes  
Streams & Rivers



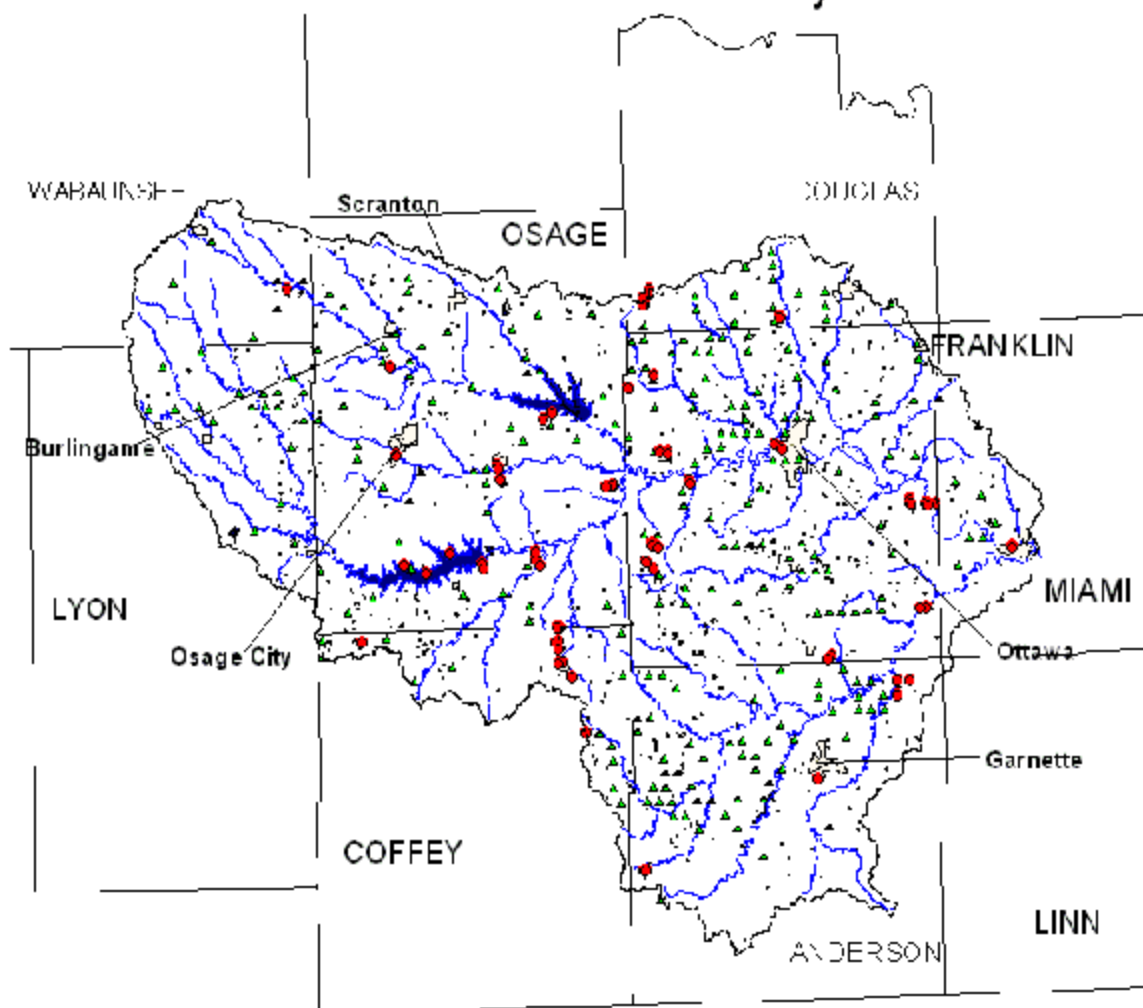
# Streams & Rivers

## Huc 10290101

# Huc -10290101- Upper Marais Des Cygnes Lake Monitoring Sites

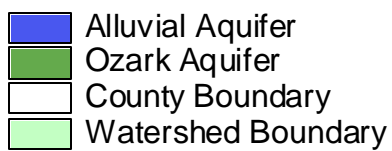
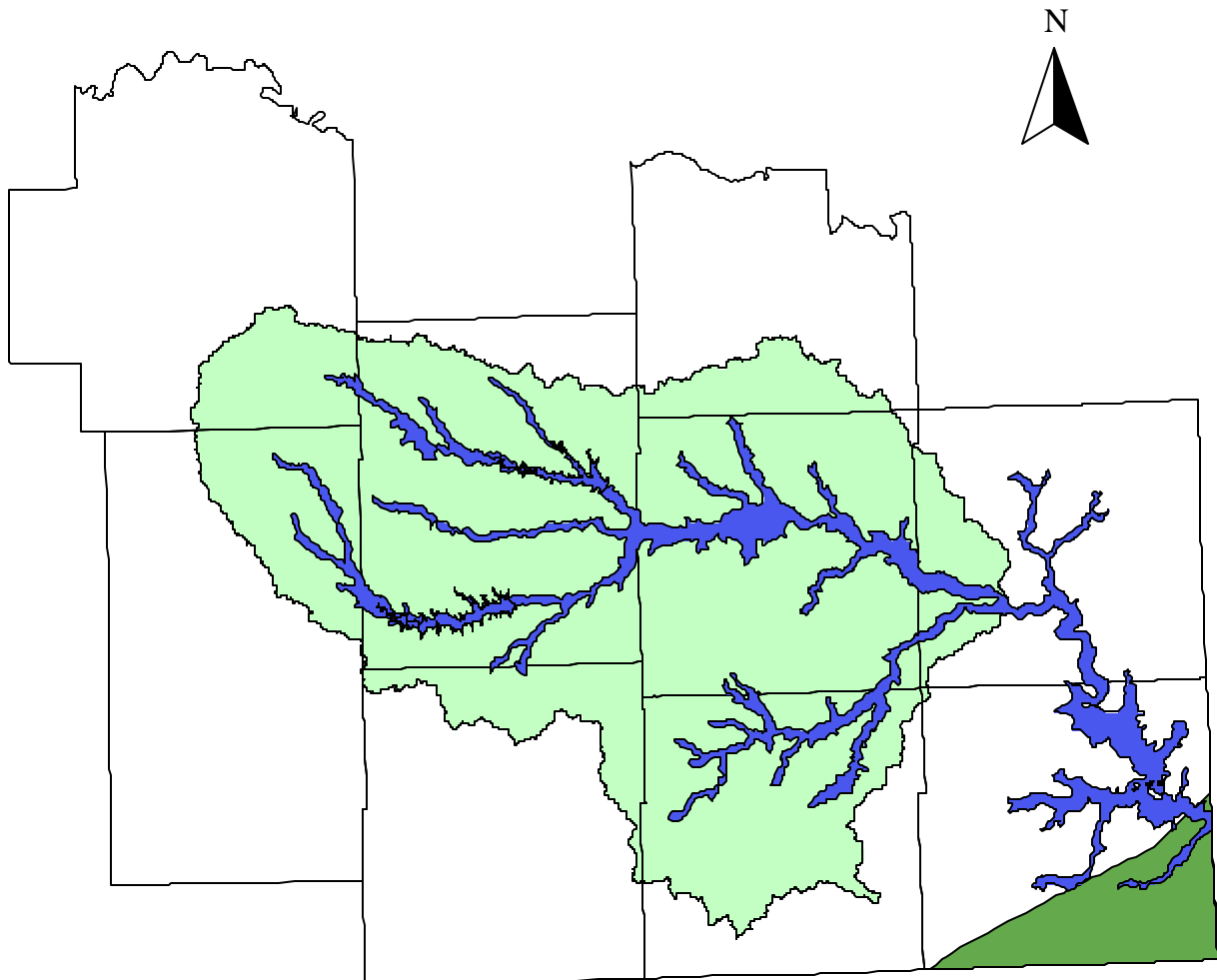


# Huc -10290101- Upper Marais Des Cygnes Watershed Boundary



- Huc 10290101
- Public Water Supplies
- ▲ Feedlots
- Cities
- ~ Streams & Rivers
- Lakes
- County Boundary

## Huc 8 10290101 Upper Marais Des Cynges Groundwater Aquifers



KDHE  
Bureau of Water  
19 November 2001  
Jaime Ziesenis